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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/09/99-525 06/18/99 HUANG

AMA. / 3577 / 10

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EXAMINER

PADGETT, M

ART UNIT

PAPER NUMBER

1762

3

DATE MAILED:

10/31/00

Pl ase find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

07/336,525

Applicant(s)

Judy Huang

Examiner

M.L. Pedge H

Group Art Unit

1762

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

P r i d f r R p l y

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- ☒ Responsive to communication(s) filed on 6/8/99
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Dispositi n of Claims

- ☒ Claim(s) 1-23 is/are pending in the application.
- Of the above claim(s) 10-23 is/are withdrawn from consideration.
- ☐ Claim(s) is/are allowed.
- ☒ Claim(s) 1-9 is/are rejected.
- ☐ Claim(s) is/are objected to.
- ☐ Claim(s) are subject to restriction or election requirement.

Application Papers

- ☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been received.
- ☐ received in Application No. (Series Code/Serial Number) _____.
- ☐ received in this national stage application from the International Bureau (PCT Rule 1.7.2(a)).

*Certified copies not received: _____.

Attachm nt(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s) 2
- ☒ Notice of Reference(s) Cited, PTO-892
- ☒ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

Office Acti n Summary

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(1) Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-9, drawn to a method, classified in class 427, subclass 331.
- II. Claims 10-17 are, drawn to an apparatus, classified in class 118, subclass 715.
- III. Claims 18-23, drawn to a product, classified in class 428, subclass 698.

(2) The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product can be made by a different process, such as pretreating the coating then applying it to the substrate, or by treating the coating by a different post-treatment process, such as ion beams or laser, etc.

(3) Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process can use a different apparatus, such as a PVD chamber and the apparatus can be used for plasma treating substrates containing no carbon.

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(4) Inventions II and III are related as apparatus and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case the apparatus can be used to make other products, because neither the substrate treated in the apparatus, nor the gases used therein are part of the apparatus.

(5) Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification and recognized divergent subject matter, restriction for examination purposes as indicated is proper.

(6) During a telephone conversation with Mr. Mulcahy on 8-10-2000 a provisional election was made with traverse to prosecute the invention of Group I, method claims 1-9. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-23 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

(7) Claims 3-4 and 7-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim of "an inert plasma" is ambiguous or vague and indefinite. If the plasma is truly "inert" it is incapable of causing any kind of reaction, ie. it can have absolutely no effect on the

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“carbon-containing layer” which means there not really any treatment. Alternately, if applicant intends that it be an inert gas plasma or inert gas-containing plasma, that’s NOT what they have claimed, even if its more logical.

Does claim 4 require the “a He plasma” in addition to the “inert plasma” or is it that plasma? The wording is ambiguous.

In claim 7 “the substantial absence.... gases” lacks proper antecedent basis.

In claim 8, lines 3-4 does applicant really intend to “apply RF power to the chamber”, as opposed to the electrodes or an antenna? This implies that the entire chamber, ie. all walls are biased, or the like. Figure 1 plus page 3 on the other hand indicates that the RF is applied to manifold (11) while the substrate support 12 and chamber walls are typically grounded, hence applicant’s actual intent in light of the specification is unclear.

In claim 9, the requirement that “the treatment plasma occurs in situ with a deposition of ... layer” is in apparent contradiction of the independent claim, that requires the treatment to be “post-deposition”, ie. after, NOT during. However, applicant’s phrasing might also be considered to be ambiguous or non-idiomatic, since in situ usually mean at the same site, but applicants have used in connection with actions rather than places, hence obscured their intent.

(8) The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

(9) Claims 1, 3, 5-7 and 9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Gärtner et al.

In Gärtner et al, see the abstract; col. 3, lines 8-65, col. 4, lines 7-20; col. 5, lines 48-58 and claims, especially 2, 3 and 7-8. Note that the intermediate plasma include use of a sequence of plasma with different gases, including an Ar plasma, without O₂ or H₂, etc.

(10) Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gärtner et al.

While Gärtner et al only exemplify the inert gas Ar, it would have been obvious to one of ordinary skill in the art to use any of the class of inert gases, as they all are equivalently resistant to chemical reactions, but are well known as plasma gases, such that their physical effects in the plasma are expected to be essentially equivalent.

Gärtner et al also does not provide any specific parameters for their plasma process, but in order for the parameters claimed by applicant to have any real meaning they need some context.

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Plasma treating (ie. coating, etching, modifying the chemistry, polymerizing, etc....) of some almost unspecified material for a completely unspecified effect, by using no gas in particular is meaningless! It would have been obvious for one of ordinary skill to determine what plasma parameter would be appropriate by routine experimentation, when knowing what gases and substrates are being treated for what effect, as one would do for the teachings of Gärtner et al.

(11) Claims 1-2 and 9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Higashi et al.

In Higashi et al, see abstract; col.2, lines 15-20 & 32-42; col.5, line 34-41 (Si and C layer deposited by glow discharge, then thereafter doped by a glow discharge process); Ex. 2-3 on col. 11-13 where an amorphous C and Si layers is deposited, with the resulting sheet being “electrified by a corona discharge”, which is noted to be a type of plasma.

(12) Claims 1-2 and 9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Nguyen et al.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al.

In Nguyen et al, see abstract; col. 1, lines 9-17; col. 2, lines 22-45 and col. 3, lines 18-47 for plasma deposition (ie. plasma treatment) of a substrate with an initially applied coating that may be silicon carbide. Gases such as C_2F_4 , etc, may be input at a rate of about 20-150 sccm, with initial RF power densities being about 0.02 to 0.05 W/cm² which are within the ranges claimed by applicant. Typical pressures during the initial plasma deposition of about 200 mtorr = 0.2 torr are slightly lower than the pressure claimed by applicant, however Nguyen et al's

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exemplified pressure is less than an order of magnitude below those claimed, and it would have been obvious to one of ordinary skill in the art that such variation would have been within the range of pressures that would have been expected to be effective and obtained by routine experimentation, especially as variations in chamber and electrodes configurations and other parameters would require varying optimizations. Note as the deposition substrate may be the walls, insitu is covered.

(13) Claims 1, 3 and 9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Sandhu (071).

Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandhu (071).

In Sandhu (071), see the abstract; col. 1, lines 28-48; col. 3, line 55-col. 4, line 48 and the table in col. 5. While Sandhu only teaches “inert carrier gas such as Ar”, the use of other inert gases, ie. He, would have been obvious for reasons given above. Note that with the confusion concerning the meaning of “an inert plasma” (112 rejection), the use of “comprising”, ie. open language, and claim 7 where applicant makes it clear that the claim 3 plasma treatment could have also included non-inert gases, any plasmas that merely have an inert/noble gas in them appear to meet claim limitations. Plasma parameters listed by Sandhu (071) include 2.00 torr, 100 sccm N₂ + 220 sccm H₂, within claimed ranges; and 625 watts, but no power density given, however it would have been obvious for one of ordinary skill in the art to optimize their power density for their particular reactor configuration and process.

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(14) Claims 1, 3, 5 and 9 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Chittipeddi et al.

In Chittipeddi et al, see the abstract; col. 2, lines 10-25; and, lines 50-col. 4, line 15 and 64-col. 5, line 4, plus claims 1 and 8.

(15) Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ouellet.

In Ouellet, see the abstract, col. 3, lines 15-65 and claims.

(16) Claims 1-3, 7 and 9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Malaczynski et al.

In Malaczynski et al, see the abstract and col. 3, lines 2-45.

(17) Claims 1, 5 and 9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Sato et al.

In Sato et al, see the abstract; figure 1-2; col. 3, lines 11-35 and col. 4, plus examples.

(18) Claims 1 and 3-4 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ueda et al.

In Ueda et al, see claims and col. 16, lines 38-60.

(19) Claims 1 and 3-7 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Bagley et al.

In Bagley et al, see claim 1 and Tables I-VI.

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(20) The patent to Nieh et al is cited as of interest for its treatment of carbon containing substrates, and its discussion of Ar^+ plasma as prior art.

The art cited in the IDS is made of record, however very few of the references therein are of any interest to the extraordinarily broad claims, except the 3 following.

(21) Claims 1, 3 and 5 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Yesuda et al.

See step 3 on col. 6, and note that the possibility that the steels could be carbon steel alloys is of interest if it could be determined.

(22) Claim 1 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Nichols et al. See the abstract.

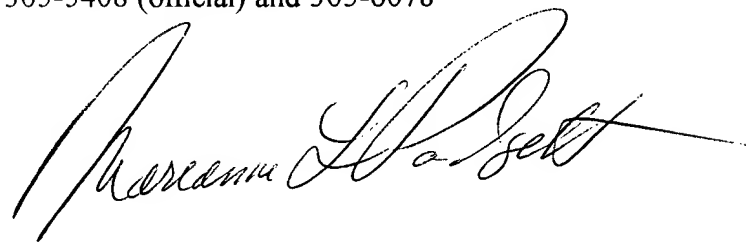
(23) Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Zhao et al. See claims 1 and 7 on col. 4.

(24) Any inquiry concerning this communication should be directed to M. L. Padgett at telephone number (703) 308-2336 and FAX # (703) 305-5408 (official) and 305-6078 (unofficial).

M. L. Padgett/vr

10-27-00

10-30-00



**MARIANNE PADGETT
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